

Notice of Allowability

Application No.

10/021,591

Applicant(s)

LARSEN, FRODE

Examiner

Alexander Jamal

Art Unit

2643

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to applicant's arguments submitted 10-19-2005.
2. ☒ The allowed claim(s) is/are 1-25.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☒ Other PTO-413B.

CURTIS KUNTZ

SUPERVISORY PATENT EXAMINER

BIOLOGY CENTER 2600

DETAILED ACTION

Response to Applicant's Arguments

1. Examiner notes that the submitted arguments have been considered and further notes an examiner's amendment (below) to all independent claims.
2. Examiner withdraws the all rejections to all claims.

Examiner's Amendment

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Daniel McClure (reg. number 38962) on Nov. 8th, 2005.

Claims 1,9,15,23 of the application have been amended as follows:

1. A transceiver interface circuit configured to transmit and receive information, the circuit further configured to perform echo-cancellation, comprising:

a digital signal processor (DSP) configured to digitally process information from a data source and to generate a transmit signal, the DSP further configured to receive and process a receive signal and a transmit error signal;

an analog front end (AFE) coupled with the DSP, the AFE configured to modify the

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transmit signal, the receive signal, and the transmit error signal;

a line driver coupled with the AFE, the line driver configured to amplify the modified transmit signal and to produce the transmit error signal; and

where the line driver comprises an inverting differential unity gain amplifier and where said transmit error signal is produced directly from the differential virtual ground input of said amplifier; and

a hybrid network coupled with the line driver and the AFE, the hybrid network configured to transmit, via a transmission line, the amplified transmit signal output from the line driver and to forward the receive signal received from the transmission line to the AFE, the hybrid network further configured to isolate the amplified transmit signal from the receive signal.

9. A transceiver interface circuit comprising:

means for digitally processing information from a data source and transmitting the information via a transmit signal, the digital signal processing means receiving and digitally processing a receive signal and a transmit error signal;

means for converting an analog signal into a digital signal and converting a digital signal into an analog signal;

means for amplifying the transmit signal for transmission via a transmission line, the amplification means producing a transmit error signal generated by the amplification of the transmit signal; and

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where the amplifying means comprises an inverting differential unity gain amplifier and where said transmit error signal is produced directly from the differential virtual ground input of said amplifier; and

means for isolating the transmit signal from a receive signal received via a transmission.

15. A system for performing echo cancellation, comprising:

a digital signal processor (DSP) configured to digitally process information from a data source and to transmit the information via a transmit signal, the DSP further configured to receive and digitally process a transmit error signal; and

a line driver in communication with the DSP via an analog front end (AFE) and configured to amplify the transmit signal and to produce the transmit error signal that is delivered to the DSP via the AFE; and

where the line driver comprises an inverting differential unity gain amplifier and where said transmit error signal is produced directly from the differential virtual ground input of said amplifier.

23. A method for performing echo cancellation, the method comprising the steps of:

amplifying a transmit signal for transmission where the line driver comprises an inverting differential unity gain amplifier;

sensing a transmit error signal generated by amplification of the transmit signal where said transmit error signal is produced directly from the differential virtual ground input of said amplifier;

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receiving and processing a receive signal with a digital signal processor, the receive signal comprising a combination of at least a remotely generated signal and the transmit error signal; and

error compensating the receive signal by means of the transmit error signal.

Allowable Subject Matter

4. **Claims 1-25** are allowed over the prior art of record
5. The following is an examiner's statement of reasons for allowance:

The instant application is deemed to be directed to a nonobvious improvement over the invention patented in Pat. Nos. (3647992,6226322). The improvement comprises sensing and digitally processing a feedback error signal from a specific point in a unity gain differential amplifier in order to compensate for amplifier non-linearities when performing echo cancellation

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander Jamal whose telephone number is 571-272-7498. The examiner can normally be reached on M-F 9AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A Kuntz can be reached on 571-272-7499. The fax phone numbers for the

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organization where this application or proceeding is assigned are **571-273-8300** for regular communications and **571-273-8300** for After Final communications.

AJ

November 8, 2005


CURTIS KINTZ
SUPERVISORY PATENT EXAMINER
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